

CLAIMS

1. An apparatus for stopping a high pressurized fluid from escaping a rupture in a pipeline, the apparatus comprising:

a support member having a first end, a second end, and an outer surface;

an inner inflatable bladder sealingly engaging the first end and the second end of the support member and substantially covering the outer surface of the support member, the inner inflatable bladder comprising a material layer substantially impermeable to fluid;

an outer material layer substantially encasing the inner inflatable bladder and sealingly engaging the first end and the second end of the support member, the outer material layer being formed of a woven fabric material capable of withstanding high inflation pressures of approximately 100 psi; and

an inflation hose for supplying pressurized fluid between the outer surface of the support member and the inner inflatable bladder.

2. The apparatus as set forth in claim 1, and wherein the inner inflatable bladder comprises layer of a material substantially impermeable to fluid, the layer of material substantially impermeable to fluid being coated on the outer material layer.

3. The apparatus as set forth in claim 2, and wherein the layer of material substantially impermeable to fluid includes one of polyurethane, Nitrile, ethylene propylene (EPDM), neoprene, and Buna-N.

4. The apparatus as set forth in claim 1, and wherein the material layer substantially impermeable to fluid of the inner inflatable bladder includes one of polyurethane, Nitrile, ethylene propylene (EPDM), neoprene, and Buna-N.

5. The apparatus as set forth in claim 1, and wherein the outer material layer includes a first layer of woven fabric material and a second layer of woven fabric material, the second layer of woven fabric material substantially covering the first layer of woven fabric material.

6. The apparatus as set forth in claim 5, and wherein the first layer of woven fabric material and the second layer of woven fabric material each includes one of 400-Denier ballistic nylon and Kevlar.

7. The apparatus as set forth in claim 6, and further comprising a protective layer covering the second layer of woven fabric material.

8. The apparatus as set forth in claim 1, and further comprising a plurality of straps included in the outer material layer for reinforcing the outer material layer.

9. The apparatus as set forth in claim 1, and further comprising a first band positioned around the inner inflatable bladder and the outer material layer on the first end of the support member to sealingly engage the inner inflatable bladder and the outer material layer with the first end of the support member; and

a second band positioned around the inner inflatable bladder and the outer material layer on the second end of the support member to sealingly engage the inner inflatable bladder and the outer material layer with the second end of the support member.

10. The apparatus as set forth in claim 1, and wherein the support member includes longitudinally extending bore to provide a fluid bypass through the apparatus.

11. The apparatus as set forth in claim 10, and wherein the support member comprises a first high strength pipe positioned at the first end of the support member, a second high strength pipe positioned at the second end of the support member, and a flexible hose connecting the first high strength pipe to the second high strength pipe.

12. The apparatus as set forth in claim 10, and wherein the support member comprises a bow stiffener having a first end and a second end, the bow stiffener having a longitudinally extending bore to provide a fluid bypass through the apparatus.

13. The apparatus as set forth in claim 12, and wherein one of the first end and the second end of the bow stiffener includes an angled surface for biasing movement of the apparatus within the pipeline.

14. The apparatus as set forth in claim 12, and further comprising a shoe positioned at one of the first end of the support member and the second end of the support member, the shoe having an angled surface for biasing the movement of the apparatus within the pipeline.

15. The apparatus as set forth in claim 1, and further comprising a shoe positioned at one of the first end of the support member and the second end of the support member, the shoe having an angled surface for biasing the movement of the apparatus within the pipeline.

16. The apparatus as set forth in claim 1, and further comprising a curable material patch positioned on the outer material layer to be forced against the rupture in the pipeline when the inner inflatable bladder is inflated and the apparatus is positioned over the rupture in the pipeline.

17. The apparatus as set forth in claim 1, and further comprising a protective layer coated on the outer material layer.

18. The apparatus as set forth in claim 17, wherein the protective layer includes one of polyurethane, Nitrile, ethylene propylene (EPDM), neoprene, and Buna-N.

19. A method of plugging a high pressure natural gas pipeline to prevent natural gas from escaping a rupture in the pipeline, the method comprising:

inserting a plug into the pipeline through an opening in the pipeline;
positioning the plug within the pipeline such that the plug is substantially over the rupture in the pipeline; and

inflating the plug to an inflation pressure of at least 100 psi such that the plug engages against the rupture when the plug is inflated.

20. The method as set forth in claim 19, and further comprising tapping the pipeline either upstream or downstream of the rupture in the pipeline to create an opening in the pipeline.

21. The method as set forth in claim 19, and further comprising positioning a saddle on the pipeline either upstream or downstream of the rupture in the pipeline.

22. The method as set forth in claim 19, and attaching a transverse pipe to the saddle.

23. An apparatus for stopping a high pressurized fluid from escaping a rupture in a pipeline, the apparatus comprising:

a bow stiffener having a first end, a second end, and an outer surface;

a shoe positioned at one of the first end of the bow stiffener and the second end of the bow stiffener, the shoe having an angled surface for biasing movement of the apparatus within the pipeline;

an inner inflatable bladder sealingly engaging the first end and the second end of the support member and substantially covering the outer surface of the support member, the inner inflatable bladder comprising a material layer substantially impermeable to fluid;

an outer material layer substantially encasing the inner inflatable bladder and sealingly engaging the first end and the second end of the support member, the outer material layer being formed of a woven fabric material capable of withstanding high inflation pressures of approximately 100 psi; and

an inflation hose for supplying pressurized fluid between the outer surface of the support member and the inner inflatable bladder.

24. The apparatus as set forth in claim 23, and further comprising a protective layer coated on the outer material layer.

25. The apparatus as set forth in claim 24, wherein the protective layer includes one of polyurethane, Nitrile, ethylene propylene (EPDM), neoprene, and Buna-N.

26. The apparatus as set forth in claim 23, and wherein the outer material layer includes a first layer of woven fabric material and a second layer of woven fabric material, the second layer of woven fabric material substantially covering the first layer of woven fabric material.

27. The apparatus as set forth in claim 26, and wherein the first layer of woven fabric material and the second layer of woven fabric material each includes one of 400-Denier ballistic nylon and Kevlar.

28. The apparatus as set forth in claim 23, and wherein the material layer substantially impermeable to fluid of the inner inflatable bladder includes one of polyurethane, Nitrile, ethylene propylene (EPDM), neoprene, and Buna-N.